

XX. *Extract of a Letter from the Abbé Nollet, F.R.S. &c. to Charles Duke of Richmond, F. R. S. accompanying an Examination of certain Phænomena in Electricity, published in Italy, by the same, and translated from the French by Mr. Watson, F. R. S.*

Paris, March 5. 1750.

May it please your Grace,

Read March 29. 1750. I F your Grace shall have done me the Honour to have perused the Treatise I sent, intituled, *Recherches sur les Causes particulières des Phénomènes électriques*, your Grace will have seen my Doubts touching the Reality of certain Facts published in *Italy*, and which have not succeeded any-where else. I will not dissemble, that the Desire of knowing how far these Things were true, has been one of the principal Motives of my Journey; and if your Grace has been desirous to have learned the Fruits of my Inquiries in this respect, you need only look over the Memoir sent herewith, which I beg your Grace afterwards to present to the Royal Society. I well know how much that learned Body interests itself in relation to the Subject of this Memoir; and, as one of its Members, I think it my Duty to communicate the Result of my Labours. As I correspond with Mr. Watson, who is well versed in these Matters, it may not be disagreeable to him to put these Papers in a Condition to be laid before the Royal Society. I have

have made the whole Tour of *Italy*, which has enabled me to make many Observations relating to Natural Philosophy. I have made some Experiments at the *Grotto del Cani*, near *Naples*, which take off a good deal, in my Opinion, of the Marvellous of that famous Phænomenon. I propose to myself the Honour of transmitting them upon some future Occasion, as my Letter is already too long. The Eruptions from *Vesuvius* were very great when I was there, and were the Prelude to three Earthquakes, which happened just after my Departure, and which I was fortunate enough not to be Witness of. The *Lagunes* of *Venice*, and the Waters of the *Mediterranean* Sea, appear luminous every-where in Summer, in dark Nights : I have discovered, that this Light proceeds from a very small Insect, which multiplies prodigiously. I have heard all my Life, that the Water of the Ocean appears sometimes luminous : It may possibly proceed from the same Cause, and I should be very glad of a particular Inquiry into this Fact. I have the Honour to be, with the most inviolable Attachment,

My Lord Duke,

Your Grace's

Most humble and obedient Servant,

The Abbé NOLLET.

An Examination of certain Phænomena in Electricity, published in Italy, by the Abbé Nollet, Fellow of the Royal Society, of the Royal Academy of Sciences at Paris, and of the Academy del Instituto at Bologna, communicated to the Royal Society by his Grace Charles Duke of Richmonde, &c. F. R. S. Translated from the French by W. Watson, F. R. S.

Electricity, after having excited every-where the Emulation of the Ingenious, after having filled us with Wonder by an infinite Number of Phænomena more singular and more admirable one than another, seems, within these few Years, to have shewn itself equally surprising, but more useful, in *Italy*, than it had done in *England, France Germany, &c.* where, for these twenty or five-and-twenty Years, so great a Progress had been made. We have heard of nothing less than the Cure, or the almost sudden Relief, of Distempers of every Kind, and of purging all Sorts of Persons in a manner of all others the most proper to avoid the Repugnance and Disgust we naturally have to medical Potions. Even that Disease which we are most desirous of concealing, was not by these means without its Remedy ; the Mercury being volatilized, and carried, by the electric Matter, into the Body of the Patient, tinged his Skin of a leaden Colour, and procured him a certain Cure by a copious Salivation.

The Manner in which this was done was not less to be wondered at than the thing itself ; Persons afflicted with inveterate Gouts, Rheumatisms, Fluxions, Tumours, &c. were relieved therefrom

by being electrized for a few Hours, and often a less Time was sufficient. Sometimes the rubbing a Glass Tube only, or at other times a Glass Tube lined with some Medicine appropriated to the Disease of the Patient, was employed. These Medicines, to exert their Operation upon the Patient, passed thro' the Glass ; and this they were very certain of, as they saw them sensibly diminish in their Quantity, although the Glass containing them was stopped as close as though sealed hermetically. To promote Stools, it is only necessary that a Person should be electrized for six or eight Minutes, holding in his Hand a Piece of Scammony or Gamboge ; the Effects were as certain, as though these Drugs were taken internally. Besides, if a Person was desirous of being perfumed from Head to Foot, nothing more was necessary than being electrized with a Glass Vessel lined with Balsam of *Peru*, *Benjamin*, or some such Drug ; and from this Electrization the Odours were perceptible for two or three Days, even so much as to incommod those to whom these Smells were disagreeable.

Effects no less wonderful than these were published every Day, by Writings printed, and printed again *, or

* The first of these Works is a Letter of M. *Pivati*, an Advocate at *Venice*. It was first printed at *Lucca* in 1747. and some time after reprinted at *Venice*, always with the same Title, *Della Elettricità, Lettra del chiarissimo Signor Francisco Pivati, &c.* This Letter was translated into *French*, and printed at *Paris*. In 1748. there appeared another Treatise, printed at *Bologna*, intituled, *Observationi fisico-mediche intorno alla Elettricità, da Gio. Giuseppe Verati publ. profess. nella universita e nella Academia delle Scienze del instituto academico Benedettino.* In the same Year 1748. there was printed at *Verona* a little

or by particular Letters and Memoirs in Manuscript addressed to the Ingenious all over *Europe*. They were also confirmed by respectable Witnesses, and by such as were capable of imposing them upon Persons the most guarded against the Exaggerations, which never fail accompanying the Relations of interesting Novelties.

The Importance of the Facts themselves, and the Appearance of Authenticity which attended them, demanded that they should be considered; and indeed they roused every-where the Attention of those Philosophers, who had for any time turned their Thoughts to these Enquiries. Every one of them was desirous of repeating what Mr. *Pivati* said had been done at *Venice*, Mr. *Verati* at *Bologna*, and Mr. *Bianchi* at *Turin*; and to begin them, as the Experiment seemed more simple, they attempted at first the Transmission of odoriferous Substances through the Pores of the Glass, the first Foundation of *Intonacatores*†, so called by Mr. *Pivati*; and which we shall, in the Progress of this Paper, call medicated Glasses; and they

little Treatise concerning medical Electricity, intituled, *Lettera del Signiore Canonico Brigoli sopra la Macchina Elettrica*. Afterwards, in 1749. there was published at *Venice* a new Treatise, considerably larger than the first, in which we find not only the Author's own Experiments, but also those of Mr. *Bianchi* of *Turin*, and of some other Persons who had taken Pains with this View. This last Work is intituled, *Reflessioni fisice sopra la Medicina Elettrica*. It is principally in this Volume that the Facts of which we are now treating are mentioned.

† Mr. *Pivati* has given this Name to the manner in which he prepares hollow Cylinders of Glass in filling them, or lining them, with some Drug, the Virtue of which, he pretends, will transude with the electric Matter.

they endeavoured to purge Persons of all Ages, and of both Sexes, by making them hold in their Hand, while they were electrized, Scammony, Gamboge, Aloes, and such-like. But it was very extraordinary, that of all the Persons who were engaged in these Experiments, no one could succeed; and, from a sort of Shame, each of them expected, that some one would complain of his Want of Success: But this was retarded, as yet, by the Haste with which Mr. *Winkler* * sent to the Royal Society, and to some ingenious Men in *France*, the Result of his own Experiments, which well agreed with those of *Italy*, and upon the Credit of which he had made them.

For my own Part, I will speak without any Restraint: When I found my Attempts were fruitless, I without any Difficulty communicated it to all the Philosophers with whom I corresponded: I desired them to let me know if they had been more successful than my myself, and to acquaint me how they had proceeded, that I might conform myself thereby. I was much more willing to confess my Inability, and to learn from others the Method which must of Necessity be observed, than to be deprived longer from seeing those Phænomena which ought to result therefrom. Instead of Instructions, which might conduct me to the Success I wanted, I received nothing but such Confessions as mine: From these I saw, that all Methods had been tried; and that nothing remained to be done, but either to believe every thing upon the Faith of others, or to doubt, without Hopes

* A celebrated Professor of Philosophy at *Leipzick*, who has written a good deal concerning Electricity.

Hopes of being better informed. The first of these two Cases was directly opposite to the Law I had determined to abide by, when I first engaged in the Study of experimental Philosophy ; and the other was putting a great Violence upon myself. But from this Moment I formed my Project of travelling ; and, among the different Motives which made me undertake the Journey to *Italy*, I must confess one of the most pressing was, the Desire of seeing succeed, in the Hands of those who had said they had, these Phænomena in Electricity, towards the Verification of which I had made so many fruitless Efforts. I formed to myself a great Pleasure in seeing Balsam of *Peru*, *Benjamin*, *Camphire*, *Cinnamon*, &c. pervade an electrized Glass, which I had taken care to stop myself ; to see People purged by the Palm of their Hands ; to see an old gouty Man, as the Bishop of *Sebenico**, clap his Hands together, strike the Ground with his Feet, and walk freely, after an Electrization of two Minutes : But what still more piqued my Curiosity was, to learn, if possible, why the *Italian* Electricity should enjoy these Prerogatives, to the Exclusion of that of every other Country. If this Singularity was as real as it appeared to be, it was a new Wonder more difficult to be explained than any other ; and of which I proposed to study attentively the Circumstances, to endeavour to find out the Cause.

If I have had the Trouble of passing the *Alps*, to search out the Truth, it is neither to conceal it, nor yet less to disfigure it with Falshood ; and I will re-

* See Mr. *Pivati's* Letter, printed at *Lucca*, p. 37.

late,

late, with a Liberty truly philosophical, all that have heard, and all that I have seen: But if, in doing this, I shall find myself obliged to contradict some of the Facts published by some Persons known in the Republic of Letters, I protest that it is without Prejudice, on my Part, to the advantageous Idea I may have of their Candour or Abilities; and I sincerely wish, that the Reader may consider them in the same manner. If he is judicious, he will willingly concur with me; because, in an Enquiry so obscure as this of which we are now treating, an ingenious Man, with a very just Intention, may take what is false for that which is true.

I arrived at *Turin* about the Beginning of *May* 1749. and one of my first Cares was, to visit Mr. *Bianchi*, a celebrated Anatomist, and the first Author of purging by Electricity. I related to him all that he had written to me upon this Subject; and I begged of him, that all the Experiments, which had neither succeeded with me, nor a great many others, might be repeated between us, and under his Direction. His Complaisance easily granted what I desired: We set about it; and Pere *Garo*, a *Minim*, and Professor of Philosophy in the University, caused to be carried to the Place where we determined to make our Experiments his electrifying Machine; which is exactly like that which I have described in my *Essay*, *Page 19. Fig. 2.*

The Experiments of the First Day.

Upon the 21st of *May*, about Four o'Clock in the Afternoon, the Weather cool, but uncertain, Mr. *Bianchi* having procured a Lump of Scammony, and

another of Gamboge, each of which was about the Size of an Hen's Egg ; I took the former in my Right-hand, and having applied my Left near the Surface of the Glass Globe, and standing upon a Cake of Resin, I was electrized fifteen Minutes without Interruption. This Day the Electricity was indifferently strong.

After me, a young Man, aged Twenty-two, and of a pale Complexion, was electrized ; whom, a few Days before, I had taken into my Service.

They then electrized a young Woman of about Sixteen or Seventeen, of a weakly Constitution ; but who, at that time, was tolerably well.

After that M. *Beccari*, Professor of Philosophy in the University, aged about Thirty-five, of a dry Habit, was electrized.

They then electrized a Servant belonging to the House where they made the Experiments, aged about Twenty-four, who did not appear to be indisposed.

They also made the same Experiment upon another Servant, a strong Man of Forty, or thereabouts ; and each of these Persons was electrized the same time as I had been ; that is, fifteen Minutes successively.

I did not perceive in myself any Effect, which I could attribute to the Electricity ; no extraordinary Motion or Pain in my Bowels ; and it was the same with M. *Beccari*, with the Servant aged Forty, and with the young Woman.

But the young Man of Twenty-two, being interrogated after the others, said, that he had had in the Night two Stools, and some Complaints of the Colic. The Servant of the House, who was asked the same Questions, declared, that he had had a very large Stool, as though he had taken a Purge.

These

These two last Depositions were, as the others, taken upon the Spot ; and I began to consider them as important, when I learned, from the Confession of the last, that he had taken, for some Days, a Decoction of wild Succory, for an Indisposition which he had not spoke of till then. The young Man who said he had had two Stools, rendered his Testimony more than suspicious, by certain Singularities* which he was desirous of adding some Hours after ; and since that time he has conducted himself in such a manner, as to prevent my having any Confidence upon what he said.

What I have just now mentioned to have found in these two Servants, one of which kept me ignorant some time of his having taken Broth with Succory ; and the other having testified such a Love for the Marvellous, that one ought in Prudence to suspect every thing he said ; This, I say, made me very delicate in the Choice of the Persons who I was desirous should be admitted to our Experiments. I declared that I was not willing to receive thereto either Children, Servants, or People of the lower Class ; but only that reasonable People should be admitted, and of an Age sufficient to leave nothing to be feared of the Truth of what they might depose.

The

* This young Man made himself very happy in relating to every body, that he had been electrized ; and that he had been purged thereby, as though he had taken Physic : And added, that, an Hour after his Electrization, having had the Curiosity of visiting his Wife, to see what would be the Consequence, he had communicated this Electricity to her, and that she had been purged as well as himself.

The Second Experiment.

The Day after we had made our first Set of Experiments I was again electrized fifteen Minutes successively, as I had been the Day before, holding in my Hand a large Piece of Scammony ; and after me there went successively through the same Trial Dr. *Scherra* a Physician, Mr. *Verne* Demonstrator of Anatomy, the Marquis of *Sirié*, the Abbé *Porta* a Professor in the University, the Preceptor to the Children of the Marquis *D'Ormea*, and the Preceptor to the young Messieurs *D'Ormea*. This Day the Electricity was indifferently strong.

Of all these Persons who were electrized, not one felt any Pains in his Belly, no one had any Evacuation which could be attributed to the electrical Power; but to say scrupulously all that came to my Knowledge, after several Questions, the Preceptor to young Messieurs *D'Ormea* declared, that he had parted with more Wind than he had usually done, and he believed also with more Urine. Thus of seven Persons there was but one who suspected the Operation of Electricity to have had any sensible Effect upon him, and this Suspicion, as we see, was a very slight one.

The Third Experiment.

The 23^d of *May*, the Electricity being more strong than the preceding Days, we chose a Piece of new * Scammony, very strong in its Flavour, and which

* M. *Bianchi* suspected, that the Drugs we had made use of in our first Experiments had lost their most subtle Parts, only capable, as he said, of being introduced with the electric Matter.

which weighed four Ounces : The Marquis *D'Ormea*, Dr. *Allion*, a Physician, the two above-mentioned Preceptors, Pere *Garo*, Count *Ferrero*, and myself, held, one after the other, this Piece of Scammony, and each was electrized fifteen Minutes, as had been done in the former Experiments.

Two Days passed, and absolutely none of these Persons perceived any thing, that could be attributed to the Electricity.

The Fourth Experiment.

The same Day we endeavoured to repeat an Experiment, which M. *Bianchi* had wrote me word of some Months before, and which had not succeeded with me at *Paris*. This Experiment was the Transmission of Odours along a Chain, or an iron Bar electrized. One of us prepared and applied a little Piece of Linen, covered with Balsam of *Peru*, upon the iron Bar, which received the Electricity from the Globe : We fastened to this Rod the End of an iron Chain, which was electrized by Communication ; and we expected, that the Odour of the Balsam would be transmitted to the other End of the Chain, to which was hung a Ball of Metal. But this was expected in vain ; nobody could perceive the slightest Sign of this Transmission.

M. *Bianchi*, seeing, as I did, that the Result of all these Experiments did not agree with those, which he had believed to have taken place before, told me, that this Difference might arise from our having employed an Electricity too strong : because that which he had experienced with Success had always appeared more weak. I submitted to this Reason,

Reason, having no other to give him more plausible ; and to bring the whole Operation, as near as might be, to its first Circumstances, we met together, to the Number of fourteen, at M. *Bianchi*'s, where we were expected ; and we were electrized, one after the other, by him, as long a time as he judged proper, sometimes with Scammony, and sometimes with Gamboge, which he himself had chosen.

The Machine used this Day was the same, with which M. *Bianchi* had always made his own Experiments. It consisted of an hollow Glass Cylinder, thrice Inches in Diameter, and something more than half a Foot in Length *, mounted between two Supporters upon a Board, which was fastened to a Table with Screws. This cylindrical Vessel was turned round, without any other intermediate Apparatus, by an Handle, which was at least four Inches in its Radius ; so that the Hand, by which this Machine was turned, revolved with greater Velocity than the Surface of the Glass Cylinder, which was thereby put in Motion.

This Machine had this Convenience, that one Person only might turn the Handle with one Hand, and rub the Surface of the Glass Vessel with his other : But there is no Difficulty in comprehending, that the Electricity could not but be always very weak with such a Cylinder, and from such Friction ; so that, in the Experiments of this Day, we were scarce able to perceive any Snaps, in touching the iron Chain, by which the Electricity was com-

* The Author here means the *French* Foot.

communicated, or from the Person electrized ; but this was precisely what was desired.

These Experiments were made on *Thursday, May 29*, between Four and Six o'Clock in the Afternoon, in a very hot and serene Day : on *Sunday Evening*, all the Persons who had been electrized, being interrogated, answered without Hesitation, and in a manner absolute in all respects, that they had perceived nothing which could be attributed to these Experiments : these Persons were the Marquis *de Siria*, Count *Ferrero*, the Marquis *D'Ormea*, Monsieur *de Tignola*, an Officer of Artillery, Pere *Bec-
cari*, Pere *Garo*, Dr. *Allion*, Monsieur *Verne*, Dr. *Scherra*, the Abbé *Porta*, the two Preceptors, the young Woman, whom I mentioned before, and myself.

The Night following, that is to say, that between *Sunday* and *Monday*, I was troubled with an Indigestion, and felt Pains of the Colic ; but I attributed them much less to the being electrized the preceding *Thursday*, than to some Roots I had eaten the Day before at Dinner, and to a very large Glass of iced Lemonade, which I had drank some time after, and contrary to my usual Custom. Nevertheless, as some Persons were desirous of saying, that the electrizing had purged me, and that I had not the Candour to speak of it, I thought it my Duty to add here for my Justification, that during my whole Life I have had a weak Stomach ; that I could never take Ice, nor Liquors very cold, without a good deal of Circumspection, and always at the Hazard of being incommoded therefrom ; and that these Roots, which are called *Ravanelle* in

C c c Piedmont,

Piedmont, notwithstanding my Attention to eat sparingly of them, had oftentimes disturbed my Digestion, during my Stay there, and at times when I had no Concern in electrical Experiments. Besides, the not being incommodeed for three Days, and more, was sufficient to prevent my attributing what happened to me to the electrical Power.

The extreme Circumspection, with which I was desirous of choosing the Persons for all our Experiments; the Difficulty of procuring and moving such sick People, who were in a Condition and Disposition to leave nothing to be feared on their Parts from their Prejudice, and their heated Imagination; that of reconciling my Time with that, which a Physician of great Practice could grant me; these Obstacles, I say, prevented my attempting with M. *Bianchi* such Cures, as he believed to have been brought about by means of the electric Virtue, either by its own Action, or by joining thereto Medicines appropriated to the Condition of the Sick, and contained in Glass Vessels electrized by Friction. But I testified a great Desire of seeing those Persons who had been cured, or considerably relieved, by this Method before this time. I asked, for this Purpose, the Gentlemen of the Profession, who had been Witnesses of the Experiments, and who were yet in a Condition of seeing every Day some of the Persons, cited in a Manuscript which I had of M. *Bianchi's*; and of whom the exact History is mentioned in the ninth Chapter of a Treatise of M. *Pivati* *: I went myself to the Shoemaker, in whose

* *Reflessioni fisiche sopra la Medicina elettrica*, p. 149.

whose Shop the young Man of twenty-one Years of Age worked, mentioned in the 110th Page of the above Treatise, and in Page 419 of my *Recherches* *. The Obligation of saying the Truth, to which Philosophers ought to sacrifice every human Regard, will not permit me to dissemble that my Enquiries made with all possible Diligence, and without any other Interest than that of knowing the Truth, have made me see sufficiently clear, that these Facts have been greatly exaggerated. I am willing to believe, that it is the Fault of the Sick, who, being prejudiced perhaps by too great Hope, and possessed by a kind of Enthusiasm, have said themselves, and made others believe, more than really was the Case. One might have Examples enough to cite of such Illusions ; but be that as it will, I cannot help believing, that a great Part of the electrical Cures of *Turin* have been no other than temporary Shadows, which have been taken with a little too much Precipitation, or Complaisance, for Realities.

I carried with me to *Venice* the same Curiosity, and the same Desire of being instructed, upon the Subject of the Transmission of Odours from medicated Tubes, and of the Cures, or of being relieved from Disorders almost suddenly, by the electrical Power. One of my first Cares was, to find out some Friends or Acquaintance of M. *Pivati* to acquaint him of my Arrival, and to obtain of him the Favour of being admitted into his Laboratory ; and

* They have translated *Hatter*, instead of *Shoemaker*, in taking the *Italian* Word *Calzettario* for that of *Calzolaio*, which was sufficiently legible in the Manuscript.

and that he would have the Complaisance to satisfy my great Desire of seeing him cause Odours to pervade the Sides of a well stopped Glass, or by electrifying to diminish sensibly any Substance therein contained. Mr. *Angelo Quirini*, a Venetian Gentleman, a great Friend to the Sciences, and one always ready to assist those who apply themselves thereto, did me this Service among many others, for which I am indebted to his Friendship and Politeness. He accordingly acquainted M. *Pivati*; and on the 1st of *August*, 1749. we waited upon him, and found there a large Company, among which were several Persons of Distinction : Among others were Mr. *Antony Moffinigo*, heretofore Embassador in *France*, Abbé *Horter*, &c. At the Sight of this great Assembly I believed (and I had some Reasons for believing it) that my Curiosity had been * suspected of Disbelief, and of an Obstinacy to doubt ; this Company therefore was called together to be an Evidence of my Conviction. I would have been willing to have bought at this Price the Pleasure of seeing a Phænomenon, for the verifying of which I had taken so much fruitless Trouble. The manner of making it succeed had been without doubt some Novelty to me, as curious itself as the Effect which should have resulted therefrom. But how great were my Surprize, and my Regret, when M. *Pivati* declared

* I had been acquainted, that my Arrival at *Venice* had been notified by Letters from *Turin*, which had described me as a Man so prejudiced against Facts, that the strongest could not make me believe. In this they did me great Injustice ; unless they took for Incredulity on my Part the Precaution I took, against Illusion, and false Appearances.

declared frankly to me, in the Presence of this whole Company, that he would not attempt to shew me the Transmission of Odours; that that Phænomenon had not succeeded but once or twice, as he had said in his first Letter printed at *Lucca*, although since that he had made many Attempts to repeat that Experiment, with the same as well as with other Glasses; that this Cylinder had been since broke; and that he had not so much as kept the Fragments of it!

But at least, I told him, I might see him use one of his medicated Tubes, and weigh it before and after electrifying, to see, with him, the included Matter diminish sensibly. This Fact, he told me, had succeeded with him a great many times; but that now there was too much Company; that it was too hot, and, in consequence, that the Electricity would be too weak for it. He might perhaps be in the Right: But why did he call together so numerous a Company?

I then asked him concerning the Cures related in his Works, and especially concerning that of the Bishop of *Sebenico**. He avowed to me (and in Part I knew it already), that the Prelate was not cured; and that, since the Electrification, he had been as he was before.

I took my Leave of M. *Pivati*, and acquainted him, that I proposed to continue about a Week in *Venice*; and I very earnestly begged of him to collect together his best Vessels, to renew the Substances therein, and to let me know, that, if they succeeded, I might wait upon him, that I might be able to publish

* See Page 374. *suprà*.

lish them as an Eye-witness; and I spoke to him with a good deal of Sincerity. M. *Pivati* promised me he would; but, as I heard nothing from him afterwards, I presume that he had nothing to shew me.

Dr. *Sommis*, of the Faculty of Physic at *Turin*, being at *Venice* a little while after me, had also the Curiosity of visiting M. *Pivati* in *August* last, and to see, under his Management, the Effects attributed to the medicated Tubes. The following is the Letter* he wrote me upon this Subject, *Nov. 15. 1749.*

“ Here is, kind Sir, in a few Words, the Account of what I observed in *Venice*, at Signor *Pivati’s*, during the Month of *August* last. The 25th Day, after Dinner, he electrified me, making use of a Tube of the Length of about five Inches, and a little more than two in Diameter, causing me to hold in my Hand an Ounce of *Scammony*. There were present at this Experiment his Excellency the Abbate *Barbarigo*, the Fathers *Bertinelli* and *Magrini*, Jesuits, Dr. *Gram-pini*, and several other Persons. I found not any Change in myself either that Evening or the following Day. The 29th of the same Month I returned again to Signor *Pivati*, where I found a Gentleman of the House of *Soranzo*, two Spanish Officers, two other *Venetian* Gentlemen, a Physician, and some others; and he caused a Tube to be lined [or plastered within] for the Experiment, which was represented by him in a dangerous Light; but which was not such however as to hinder my telling him, that I desired that the Experiment might

* This Letter is translated from the *Italian*.

" might be made upon myself. He began then to
 " electrize me at 35 Minutes after Five in the After-
 " noon, and made an end, because the Line of the
 " Wheel tangled, at 57 Minutes after Five. Having
 " then new-fitted the Line, he began again at five
 " Minutes after Six, and continued till 14 Minutes
 " after, making again this time the Sparks to issue con-
 " tinually from my Forehead. This Tube was nearly
 " of the same Length and Size as the former. The Ex-
 " periment being over, I then prayed him to tell with
 " what Materials the Tube had been lined; and so
 " much the rather, as he had let fall in Discourse with
 " the *Spanish* Gentleman, that they might have seen
 " me sleep; and he answered me, that the Tube was
 " lined with two Ounces and six Drams of Flowers of
 " *Benjamin*, and two Drams of *Opium*. Having heard
 " him mention the *Opium*, I prayed him to take
 " the Trouble of making another Experiment, his
 " Excellency Signior Abbate *Pietro Barbarigo*, and
 " myself also, having with us an Ounce and Half of
 " *Opium*; and he complied with my Desire. He
 " therefore electrified his Excellency, making him
 " hold the *Opium*, that is to say, the Quantity of
 " half an Ounce of it, in his Hand, and the Sparks
 " issuing from his Hand for half an Hour toge-
 " ther, beginning at 18 Minutes, and finishing at 48
 " Minutes, after Six. In this second Experiment he
 " made use of the same Tube which he had used the
 " Monday before, the 25th of the same Month: But
 " neither his Excellency nor I slept more than ordi-
 " nary. These are the Experiments which I made
 " at *Venice* with Signor *Pivati*. In my Return
 " home, passing thro' *Placentia*, I here spoke with
 Dr.

" Dr. *Cornelius*, who assured me, in Presence of
 " Dr. *Riviera*, that he also had tried a great many
 " times to purge others by electrifying them ; but
 " that it had never succeeded with him but once,
 " which was upon a Maid-Servant, to whom he had
 " given some Rhubarb to hold in her hand. Not-
 " withstanding which, finding it never to have pro-
 " duced the same Effect in any other Person, it ra-
 " ther seemed to him, that some other Cause might
 " have occasioned what happened to his Maid.
 " Please to let me know, if in any thing else I can
 " obey your Commands, and you shall ever find me
 " ready, to the best of my Ability," &c.

We see then from this Letter, and from the Account I have before given of my Visit to M. *Pivati*, that I have not been able to verify at *Venice* any of those Facts, in which my Curiosity was interested. I might add also (and I ought, without Doubt, since I have engaged to mention exactly every thing I have been able to find out from my Enquiries upon this Subject), that of all the Persons of the Country, who have been with M. *Pivati*, to be certified of the Truth of his Experiment from ocular Demonstration, and whom I was able to interrogate, I found but one who attested them, as having seen them : This was a Physician, a Friend of M. *Pivati*, whom I found at his House, and who had, as he said, almost always assisted him in his Experiments.

From *Venice* I went to *Bologna*, where I became acquainted with Dr. *Verati*, a Member of the Academy *De l'Institut*. From the frequent Conversations I had with him, I was convinced that he was a learned, wise, and candid Man, as I had heard before.

I laid before him, without Scruple, the Doubts I had, touching the Transmission of Odours, the Effects of lined Tubes, purging by electrizing, as well as the almost sudden Cures.

Dr. *Verati* answered me, first, " That he had made many Experiments, from the Result of which it seemed to him, that the Odour of Balsam of *Peru* pervaded from within to the Outside of a Glass Cylinder which he shewed me." This Tube however, at this time, would not convince us of its having been done, although we rubbed it with our Hands very strongly. But upon my representing to him, that as the Glass was closed only with wooden Stoppers, which could be taken off at Pleasure, to put in or take out the odoriferous Substances, it might happen, that the Odours, agitated by the Heat, might have passed through the Pores of the Wood ; he answered me, " That this was possible ; and although Appearances had inclined him to believe the Transmission of these Odours through the Pores of the Glass, he had nevertheless suspended his Judgment upon this Effect, as well as upon that from lined Tubes, until new Proofs, made with more Precaution, should have entirely dislispated his Doubts. Secondly, with regard to the Purging by Electricity, he had in his House a Man and Maid-Servant, who had been purged in this manner : That at least these two Persons had felt the same Effects as though they had taken Physic ; after having been electrized in M. *Bianchi*'s manner : That this Effect having no other apparent Cause than the preceding Electrization, the great Number of Facts of this kind, which had mani-

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“ *fested themselves at Turin*, had determined him
 “ to believe, that what happened to his two Ser-
 “ vants was the natural Consequence of this Electriza-
 “ tion : That, with regard to the rest, he proposed
 “ to try the Experiment again upon a sufficient
 “ Number of Persons of another Sort ; and if this
 “ Method of Purging was not constant, accord-
 “ ing to the Idea he had had thereof, he would cor-
 “ rect, with great Freedom, what he had published
 “ thereupon in his Works, printed in 1748.”

Thirdly, Mr. *Verati* assured me, “ That the ten
 “ Cures, related in his Work just mentioned, were
 “ exactly made in the manner they are described : ”
 And they are related with a good deal of Prudence,
 and with a Simplicity which characterizes the Truth.
 The fifth of them was told and certified to me by
 the Person himself, one Day when I visited Father
Trombelli, Abbot of the House in which he lives.
 These Cures are not such as give me Difficulty to
 believe them : We see, at least, that they are made
 with Speed : We see that the Disorder, if I may be
 allowed the Expression, defends itself against the
 Remedy, and does not give place but by little and
 little ; and that Nature makes no sudden Transition
 from one State to the other absolutely different, by the
 means of an Electricity scarce sensible. These Cures,
 I say, give me no Trouble to believe them ; because
 it appears to me natural enough, and I have said it
 a great while ago *, that a Fluid, active as the electric
 Matter, and which passes into our Bodies with so
 much

* In a Discourse read to the *Royal Academy of Sciences* just after
 Easter 1746.

much Ease, may produce therein, in time, Alterations either * salutary or pernicious.

I learned nothing in the other Cities of *Italy*, which did not strengthen my Doubts in relation to those electrical Phænomena, which I had a Desire to verify in the Course of my Travels. Pere *La Torre*, Professor of Philosophy at *Naples*; M. *De la Garde*, Director of the Coinage at *Florence*, one who has been much engaged in these Inquiries; M. *Gua-dagni*, Professor of experimental Philosophy at *Pisa*; the Marquis *Maffei*, at *Verona*; Dr. *Cornelio*, at *Placentia*; Pere *Garo*, at *Turin*; all these, I say, with very excellent and well-contrived Machines, and with a great Desire of succeeding, have attempted many times to transmit the Odours, as well as the Powers of Drugs closed (carefully) in Tubes or Spheres of Glass, by electrizing them: All these have attempted to purge a Number of Persons; and, according to the Accounts they gave me, have never gained their Point; or the little Success they had, appeared too equivocal to draw therefrom Consequences conformable to those M. *Pivati* had believed to have seen in his Experiments.

I am now then, as it were, certain of what I began to believe last Year, when I printed my Treatise, intituled, *Recherches sur les Causes particulières des Phænomenes Électriques*: I am, I say, as it were certain, that M. *Pivati* has been deceived by some Circumstance to which he had not given sufficient Attention; and what makes me believe it more than ever is, that he assured me himself, that this Transfusion of Odours, and of Drugs, through

* See these *Transf.* No. 476. p. 479. C. M.

electrized Glass Vessels, had never manifested itself to him but once or twice directly; I mean by a sensible Diminution of Bulk, and by such Emanations as the Smell was capable of perceiving.

Since I have understood *Italian*, I have been surprised not only to find this Confession in a Letter printed at *Lucca**, but also to see, that it had not had all the Effect it ought to have had upon the Minds of those, who have been in a Situation to be instructed: For my own Part, had I known it earlier, I might have saved myself a great Part of the Trouble I have taken in verifying the Fact; and I am astonished, that they should be desirous of building upon such very slender Foundations.

It is however upon this pretended Transmission, and with a glass Tube, *which was cracked from one End to the other*, as M. *Pivati* tells you himself †; it is, I say, upon this Fact, than which, in my Opinion, nothing can be less certain, that they have established the Use and Effects of *lined Tubes*, of which they are willing to abate nothing. But how can we reconcile these two things, the almost never failing Operation of *lined Tubes*, upon so many Distempers which are said to have been cured, or considerably relieved, on one Part, and on the other the Transmission so very seldom to be perceived of the Odours of the Drugs inclosed in those Glasses, with

* Page 28: *Un tale dileguamento succedutomi in un cylindro, non mi è poi veramente succeduto in altri, di quali mi son servito per varie guarigioni.*

† *Si confumo la materia interna a segno, che si ridusse nonostante l'essere quasi ermeticamente serrato alla sottilezza di un delicato foglio di carta, e come un capo morto, che ne tenza più odore ni sapore, e fino il vetro medesimo quasi consunto si apri da se stesso in più fissure per longo;*

with which you electrize? If it is truly the *Peruvian* Balsam, the Benjamin, Camphire, &c. which, being animated by the electric Matter, have brought about so many Cures, as M. *Pivati* has given us in his Writings, why do not these strongly-scented Substances send forth their Effluvia copiously, and always, in those Places where the Experiments are made? And why do they not communicate themselves by their Odour to all Persons, who are penetrated thereby by means of Electrification? Will they say, that the Electricity, specifically operating upon their medical Virtue, separates it from their odoriferous Quality? Miserable Subterfuge! Which does not merit to be opposed seriously; and the more so, as it is by the Transfusion of their Odours, that they pretend to be assured of the Efficacy of their *lined Tubes*.

I am disposed to believe, that the Electricity may have cured or relieved distempered Persons; but I do not find the Proofs of M. *Pivati* sufficiently strong, or sufficiently certain, to make me conceive, that the *lined Glasses* have contributed to these good Effects. I think, and M. *Verati* himself appeared to me pretty much of the same Opinion, that if any one has been so happy as to cure Distempers by electrifying with Glasses containing Drugs, all that can be said in Favour of these Substances is, that they have not hindered the Operation of Electricity.

M. *Pivati* appears by his Conversation an honest and disinterested Person, and one capable of inducing me to be of his Opinion: But among the Facts which he collects in his Writings to fortify his Proofs, I find some that do not do much Honour to his

his Delicacy in choosing ; and which may make him suspected of too great Credulity. Would one believe with him for Example, that the electric Virtue was capable of setting a Watch a going, which was stopped ; and, by its means, of regulating its Motion, when so disordered as to be impracticable to be done by the Hands of the Workmen *? Would one believe with him upon the Faith of a Letter void of Authority, and without having tried it, " that an " Ounce of Mercury had been entirely evaporated " through the Pores of a Glass Vessel, with which a " Man was electrized, which had made his Skin of " a leaden Colour, and which had been followed " by a copious † Salivation ? " This Fact, which was said to have been done at *Naples*, interesting as it is, had there made so little Noise, that I was not able to find any Traces of it during my Stay in that City, after the printing and publishing of the Book, in which it is cited.

If any one should think fit to say, that it is from Humour, or from some personal Interest, that I am so obstinate in disbelieving the Facts published in *Italy*, which are the Subject of this Memoir, I flatter myself, that so unjust an Imputation will make no Impression upon reasonable People, by whom I have the Honour of being known, either personally, or by my Writings. Have not I received and published in *France* all the Wonders in Electricity, which

* *Reflectioni fisiche sopra la medicina ellettrica*, p. 103. *La subita efficacia (della ellettricità) in dar giusto movimento alle mostre, di orologio, o ferme, o rotative, o ritardanti senza rimedio.*

† *Ibid.* p. 153.

which have manifested themselves in *England*, in *Germany*, and in *Holland*, as soon as I have been able to be assured thereof by a Repetition of them? Have not I spoke and written concerning the Cure of the Paralytic of *Geneva*, as a Man truly persuaded of the Truth of the Fact, since it had been so justly authenticated *? By what Caprice then am I made more difficult of believing what passed in *Italy* than in other Countries, if the Phænomena, which are pretended to have been seen there, could have been repeated; or if the Testimonies, which they offered me, were not considerably weakened, or entirely abolished, when, being in the Places themselves, I was in a Condition of knowing their just Value?

Had I only consulted my personal Interest, to whom would it have been more convenient than to me, to have adopted these Novelties? If they were real, they would have been so many evident Proofs of a Principle †, by which I have endeavoured to account for the electrical Phænomena: A Principle, which as yet has sufficiently well served me, and which, having offered itself to Mr. *Watson* as well to myself, has enabled him likewise to give some Inferences exceedingly probable concerning them: Would not Odours, would not medical Substances, carried through the Pores of Glass, prove, without Doubt, that the *effluent* electric Matter served them for a Vehicle? If purging Substances were forced to

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* See my *Essai sur l'Électricité des corps*, printed at *Paris*, 1746, and my *Recherches sur les Causes particulières des Phænomenes électriques*, 1749.

† *Essai sur l'Électricité des Corps*, p. 148. et suiv.

pais into the Hand, and into the Body, of an electrified Person, could one doubt of their being introduced there by the *effluent* Matter, which came to the electrified Body ? If the Electricity restores Health to a sick Person, in delivering him from some vicious Humour, might not I say with great Probability, that this Effect is brought about by the Effluence of the electric Matter ? Especially as I have demonstrated by Experiments, made with great Care, that this same Matter, in going from the Body electrified, accelerates, and considerably augments, the insensible Transpiration of Animals, and, in general, all organized Bodies, replete with Fluids.

I have then set apart my own Interest to follow the Truth ; and if Prejudice has tended to lead me astray, it would be in inclining me to receive rather than call in doubt the Facts, which are the Subject of this Paper. It is only because I cannot consider them as true, that I refuse to believe them ; and this even with Regret, as they favour my System : This indeed is of no great Importance ; but what makes me more desire their Reality, is, the great Good which would result to Society. Could any good Subject, possessed of the Art of healing by Electricity, as M. *Pivati* pretends to be, spend his whole Time better than in devoting it to the Relief of a great Number of human Creatures, afflicted with great Variety of Maladies ? I am induced to believe, that the Greatness of this Idea has imposed upon those, who have published, without Doubt, with a little too much Precipitation, this new Medicine : The great Desire of being useful has made them hope ; and the Goodness of their Hearts making them dis-

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pense too easily with the Severity of a necessary Examination, it may be imagined, that they have considered as real Success, what was in Truth only a Phantom.

It remains to say, that in these Researches I have coveted Truth, only for her own sake ; and have no Interest in convincing those who may think proper still obstinately to believe, what has been published concerning lined Tubes, electrical Purgations, instantaneous Cures, &c. I do not pretend to make any of my Opinion, but those, who, having read without Prejudice what I have here related, may find themselves touched by my Reasons : But if after this there can be any one, upon whom the Love of the Marvellous can make a victorious Impression, I shall not think ill of them, if they embrace Opinions opposite to mine ; *Qui vult decipi, decipiatur.*

XXI. An extraordinary Case of a Fracture of the Arm ; communicated by Mr. John Freke, F. R. S. Surgeon to St. Bartholomew's Hospital.

*Read April 5.
1750.* **T**HE following Extract of a Letter from Mr. John Barde, Surgeon, in New York, having been communicated to me, I thought the Case so curious, and to have been treated in so skilful and regular a manner, as to be worthy of being laid before this learned Society.

J. FREKE.

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